

**Digital Weight Apparatus Having a Biometrics Based Security Feature**

**RELATED APPLICATIONS**

Benefit of priority under 35 U.S.C. 119(e) is claimed herein to U.S.  
Provisional Application No.: 60/543,057, filed February 9, 2004. The disclosure of  
5 the above referenced application is incorporated by reference in its entirety herein.

**FIELD OF THE INVENTION**

The present invention relates to a device that is useful for weighing objects,  
such as a bathroom scale; that is capable of creating, storing, updating and  
communicating data within one of a plurality of user profiles; that is easily  
10 programmable; and that maintains the privacy and security of said data using  
biometric identifiers.

**BACKGROUND**

Weight control has become a modern obsession. It is virtually a national  
pastime in the United States, where many tens of millions of Americans struggle daily  
15 with diets and exercise programs. Some are motivated by a desire to live a healthier  
lifestyle. Others are driven by a need to alleviate anxiety about personal appearance.  
All prefer that a weight control regimen is easy to maintain. Though weight control is  
common to most of the population, there is still a strong desire by individuals that  
their weight control information is kept confidential.

20 Digital scales are an important tool used by many in a program of weight  
control or management. Most digital scales known in the art do little more than

measure and display a user's current weight. Some prior art digital scales may display additional measurement information, such as recent weight loss or gain, body mass, bioimpedance or a calorie counter. Still further, digital scales in the prior art will display graphs of historical weight measurements, thereby indicating a weight change trend. Unfortunately, the digital scales known in the art are generally ineffective in securely maintaining a plurality of users' information stored within said digital scale, and are further inefficient and laborious in accessing and updating the user's profile and measurement information.

Data relating to a person's weight control regimen is considered to be personal to the individual and thus individuals desire to keep said information private. Using the record keeping devices and measurements of the prior art, the individual's privacy is easily breached. Printed and handwritten records of the prior art offer little privacy, and are easily lost. Digital scales of the prior art offering password protected user profiles attempt to offer some level of privacy; however, said passwords are tedious for the user and are easily accessed by others. Passwords can be lost, they can be viewed by others, they can be randomly selected by more than one user, or any of a variety of events may occur to breach the security of a password protected user profile. In addition, the use of a user code is tedious in that the user must remember the code, manually enter the code and maintain the secrecy of the code. These steps must be taken every time a user is simply trying to get a weight measurement stored in said user's profile.

Although several prior art digital scales have attempted to offer a device that is capable of privately maintaining a variety of weight management information, the devices of the prior art are deficient in accomplishing this goal. Thus, there is a need in the art for a device that is capable of securely maintaining a plurality of user profiles, wherein said maintenance is easy to the user, secured from others, and displays comprehensive and informative data to the user.

#### **SUMMARY OF THE INVENTION**

A programmable microprocessor-controlled weight device capable of automatically determining whether a current user is a new or existing user, and proceeding accordingly from said determination. Depending on whether said user is

new or existing, the digital scale will either set up a new user profile or access a user's stored records, respectively. The digital scale recognizes a user based on a biometric input. If the biometric input is not compatible with any profile currently stored in memory, the user will be automatically prompted as to whether said user would like  
5 to create a user profile. At this point, the user will review the prompt, and, if the determination were incorrect, the user can step off of the weight device and restart the process for a second read. But, if the determination is correct, the user merely need remain on the weight device until the preprogrammed time period lapses, and the determination is then accepted by the user.

10 The user's profile, having been either created for a new user or accessed for an existing user, is then updated with the newly measured information, which is communicated to said user. Biometric user identification is useful not only for ease of profile access, but biometric access also allows the user information to remain confidential. Whereas the digital scales of the current art protect user profiles with  
15 passwords and other access codes wherein the profile access code is easily obtained by others, the current invention's biometric information is accessible only using the user's unique biometric identifier. This is advantageous over the prior art in numerous settings, such as in the gymnasium, multiple person housing, doctor's offices, and other settings wherein a weight device is accessible to more people than  
20 just a single user. Information stored in a user's profile can include, information measured by the device over a period of time, as well as trend and projection data and target goal data. Such data is either automatically acquired by the device or, as in the case of custom information such as target goals, said data is manually input into the weight device.

25 Measured information and, optionally, custom data, can then be loaded to and from the current user's profile, allowing the user to maintain a user profile comprising a comprehensive set of data relating to current measurements, physical attributes, trends and projections of measurement change, target goals and other similar information. The information in a user's profile is easily accessible by the proper  
30 user, and is securely maintained to prevent unauthorized access by others.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a block diagram of one embodiment of the weight device of the current invention.

Figure 2 is a block diagram of one embodiment of the weight device showing  
5 a user's foot positioned towards the weight device platform

Figure 3 is flow diagram of one method of use of the weight device.

### **DETAILED DESCRIPTION OF THE INVENTION**

Various aspects of the system and method of the present invention will be described, and for purposes of explanation, specific configurations and details are set  
10 forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced without these specific details. Furthermore, well known features have been omitted or simplified in order to prevent obscuring the present invention.

The device of the current invention can be any weighing device, such as  
15 weight scales, body mass indicators, fat scales, fat analyzers and combinations thereof; and, for this description of the current invention, the term "weight device" will be used to refer to these and other similar devices. The preferred embodiment of the weight device, herein, is that of a bathroom scale for obtaining the weight of a user. Those of ordinary skill in the art will readily apply the current invention to a  
20 variety of similar devices, and such applications are well within the spirit of the current invention.

Similarly, a weight device can obtain a variety of measurement information, including, but not limited to: weight, body mass, fat percentage, bioimpedience, calorie count and other similar information; and, for this description of the current  
25 invention, the term "measurement information" will be used to refer to these and other similar measurements. The preferred embodiment is of a weight device that obtains the weight of a user. Those of ordinary skill in the art will readily apply the current invention to a weight device that is capable of obtaining a variety of information, and such applications are well within the spirit of the current invention.

In a preferred embodiment, the weight device of the current invention is a biometrically operated weight scale useful for obtaining weight measurements in humans. In the current art, weight scales are available wherein a user sets-up, accesses, reviews and alters a user profile by manually entering a user code. Such entry is laborious and the user codes can be seen and copied by others, thus destroying any degree of privacy these devices may offer. The current invention uses a biometric identification system to overcome this deficiency in the prior art, which only requires a user's unique biometric identifier, e.g., fingerprint, iris scan, toe print, etc, to automatically set-up, access, review and alter a user profile. Biometric identifiers cannot be lost, copied or stolen like user IDs and passwords are. Nor do they have to be memorized. Thus, the current invention offers a high level of privacy and security for the user's personal weight management information.

Weighing scales are useful in many environments, including, by way of example only and not limitation, private residences, gymnasiums and other sporting facilities, automobile seats, and medical offices. In the preferred embodiment, the weight device has an electronics unit, wherein user profiles and, optionally, custom data is stored. Custom data can include any data that a user desires to store, including, but not limited to, custom user identification, height, gender, age, current measurement information, past measurement information, past measurement information trends, trend based projected measurement information, average measurement information, target measurement information, comparison of target versus average measurement information, measured information management information and measured information goal information. It is obvious to those of ordinary skill in the art that the invention of the current disclosure can be applied in any environment wherein weight scales can be used. Such applications are obvious in light of the current disclosure and do not exceed the scope or spirit of the current invention.

Referring now to figure 1, the weight device 2 of the current invention is described. In a preferred embodiment, the weight device 2 of the current invention is a digital bathroom weight scale having a housing 4, an electronics component 6, a biometric identification system 8, and a user communication device 10. In an alternative embodiment, the weight device also includes a data entry module 12.

In the preferred embodiment, the weight device 2 is positioned on the floor, and housing 4 is substantially flat such that housing 4 further comprises a platform allowing a user to comfortably stand on said weight device in order to activate the biometric system 8 and to allow the weight device to obtain current measurement  
5 information. The platform of housing 4 can be substantially flat, or can have contours to guide the user towards proper positioning on said platform. Users generally position themselves on a weight device, such as a bathroom scale, such that the left and right feet are at a predictable location on the housing 4 platform. For weight devices 2 having a substantially flat housing 4 platform, this position is generally  
10 where a comfortable stance position would be. For weight devices having a contoured housing 4 platform, this position is where the feet are placed comfortably within the contour cradles. Predictable user positioning is possible with the other variety of weight devices available on the market.

The biometric identification system 8 of the weight device 2 is preferably  
15 placed such that the scanner of said biometric identification system 8 is in a position allowing easy access by the user when weight device 2 is being used. Referring to figure 2, the weight device 2 comprises a housing 4 with a substantially flat platform for the user's feet. The biometric identification system 8 further comprises a scanner 14 exposed on the exterior of housing 4 and traversing housing 4 therein electrically  
20 connecting said biometric identification system 8 to the electronics component 6. Thus, scanner 14 is in a position whereby, when positioned on housing 4 of weight device 2, the user's foot - more preferably the user's toe - contacts said scanner 14 of the biometric identification system 8. The biometric identification system 8 obtains the user's unique identifier, in this preferred embodiment the user's toe print, digitizes  
25 said unique identifier, communicates the digital information to the electronics component 6 where the unique identifier is checked against a database of user identifiers and the results of said user profile search are communicated to communication device 10.

In an alternative embodiment, the biometric identifier scanner is placed  
30 wherein a user's fingerprint is scanned. A variety of weight scales include podiums and/or hand rails. (See for example, SECA 645 Electronic Handrail Scale, SECA 954 Chair Scale, SECA 664 Multifunction and Wheelchair Scale, SECA 767 Column

Scale, and SECA 882 Flat Scale with Remote Unit, all available from SECA Corporation, Diamond Bar CA). Such weight scales are designed such that a portion of the weight scale is at least waist high or otherwise accessible to the user's hand while the user is in position for weighing on said weight scale. These weight scales  
5 can have the biometric identifier scanner positioned such that the user can place their hand and/or finger on said biometric identification scanner for identification.

Biometric identification technology has low to nil rates of false recognition, false rejection and failure to enroll, and thus is useful for creating and maintaining secure and private user profiles. It is advantageous to the user of the current invention  
10 that said user's weight management information -- including measured information and/or custom data -- is kept secure using the biometric identification system of the current invention. Such means of maintaining user privacy is much easier and more secure than what is available in the private art. It is further advantageous that the weight device of the current invention can utilize said biometric identification data to  
15 create and access user profiles stored in said weight device, requiring nothing more from the user than proper positioning on said weight device. Such creation and accessing of user profiles without the need for tedious manual inputs is a further advantage over the prior art.

In the current invention, a user is positioned on the weight device 2 and  
20 biometrically identified as described immediately above. The user profile search is performed and is communicated by the electronics component 6 to the communication device 10. In a preferred embodiment, communication device 10 is an LCD. The electronics component 6 will first communicate whether the user has been identified as an existing or a new user. Although error rates for biometrics are  
25 very low, errors are possible. Should an existing user be identified as a new user, communication device 10 will state such. The electronics component 6 offers a short period of time before the new user profile is saved in memory, and, in this situation, the user will step off of the weight device 2, thereby not accepting creation of a new user profile, and will step back on to the weight device 2 to receive a new  
30 identification read. Other error correction methods are obvious to those of ordinary skill in the art.

Once a user profile has been either created or accessed, depending on whether the user is new or existing, respectively, the user's profile data is presented by communication device 10. Data presented on communication device 10 can include, but is not limited any combination of measured information held in memory of electronics component 6, or currently being received because of the user's positioning on weight device 2. In a preferred embodiment, communication device 10 is capable of displaying past trends for the measured information. For example, the user's measured information is acquired by the weight device 2 and is date stamped and stored in electronics component's 6 memory. During subsequent uses of the weight device 2 by the user, said user can look at past trend measurement data. Said past measurement data can be presented as measured values, average periodic change in values, or comparison to goal readings. Communicated measurement data can additionally appear as graph plots and trends wherein weight change is displayed as a function of time for a defined period of time. Similarly, this trend information can be projected forward to show future weights as a function of future dates given the current rate of change. In addition, trends and projections can be compared to goals that are entered into a user profile (entry of custom data is discussed directly below) in order to show a user, for example, how said user is measuring in compare to a goal measurement or can show time until a final goal is reached. Other measured data displays are readily employed with the current invention by those of ordinary skill in the art.

Custom data can be entered into weight device 2 through data entry module 12. In one embodiment, data entry module 12 is an alphanumeric keypad and data is manually entered using alpha numeric keys. Such information includes that which the weight device 2 cannot obtain via the biometric identification system 8 or through the load sensors, strain gauges or other common measurement devices. For example, the biometric identification system 8 will scan a new user, and will create a new user profile; however, the user will then be given a randomly generated user name. If the user desires to customize his or her user name, then said user will enter the custom name using the data entry module 12. Similarly, the data entry module allows users to enter age, gender, height and other similar information. Data entry modules 12 can communicate with the weight device 2 using any of a variety of means well known in



the art, including, but not limited to wireless communication and wired communication.

More complex custom data can be entered into the user profile using a data entry module 12. For example, a user's health care provider or personal trainer may  
5 prescribe a set of target goals relating to a weight loss routine for the user. Because these types of custom profile data may be detailed, and thus would be time consuming to enter using an alphanumeric keypad, the data entry module 12 can be a port for accepting removable media such as floppy disks, CDs, memory cards and the like containing the custom data. Here the custom data is already entered on to the  
10 removable media and need only be transferred to the user profile of a user's weight device(s) 2. In this example, the user inserts the removable media into data entry module 12 and the information transfers into and will update the user's profile. Similarly, should a user desire to transfer information from said user's profile onto a removable media source, such as when the user would like to take a progress report to  
15 said user's healthcare provider or personal trainer, the user inserts the removable media into the data entry module 12, and the information loads onto said removable media. The user's health care provider or personal trainer then, in turn, can review the history of measured user data and trends as well as comparison of actual to goal data. Said health care provider or personal trainer can then comment and discuss the  
20 progress with the user and may alter a regimen based on said reviewed data. In an alternative embodiment, said custom data can be transmitted wirelessly when data entry module 12 is equipped with wireless communication capabilities. Further embodiments wherein complex data is communicated to and from a weight device 2 using data entry module 12 are known by those of ordinary skill in the art

25 Turning now to figure 3, an exemplary method of using a weight device comprising the current invention is illustrated. In this example, a user is on weight device 2 in proper position 100 such that the biometric scanner 14 can identify the user 220 and such that the weight device 2 can obtain measurement information 240. The biometric identification system 8 obtains and digitizes said biometric  
30 identification information, and then transfers said information to the electronics component 6. The electronics unit compares the obtained information to the database of user profiles to determine whether the current user is a new user or an existing user

300. If it is determined that the current user is a new user then a new user profile is created 320. If it is determined that the current user is an existing user, then the existing user profile is accessed 340. This determination is communicated to the user 400 via a transfer of the determination from the electronics component 6 to the communication device 10, and, if determination 300 is incorrect, the user can disengage from the weight device 2, thereby deleting said determination 300. In this case, the user will reposition on said weight device 2, and the process begins from step 100. However, if the user determination 300 is correct, the user stays in position for the short time period and determination 300 is accepted, and steps 320 and 340 proceed.

Once determination 300 is accepted by the user and a user profile is created 320 or accesses 340, the user profile can be updated 500. Updated information can include measurement information currently obtained by weight device 240 or can include custom user data 600 entered using data entry module 12. Both obtained measurement data 500 and custom user data 600 are transferred to the electronics component 6 where the data is stored in memory for that user's profile. In addition, the obtained measurement data 500 and the custom user data 600 can be communicated to the user 400, preferably, but not necessarily, via an LCD communication device 10. Further, said measured data 500 and/or said custom data 600 can be communicated to a removable media source, thus allowing the measured data 500 and/or said custom data 600 to be transferred to other machines.

While the particular systems and methods shown and described herein in detail are fully capable of attaining the above described objects of the this invention, it is to be understood that the description and drawings presented herein represent one embodiment of the invention and are therefore representative of the subject matter which is broadly contemplated by the present invention. It is further understood that the scope of the present invention fully encompasses other embodiments that may become obvious to those skilled in the art and that the scope of the present invention is accordingly limited by nothing other than the appended claims.